What Cover Crop to Use?

Brenna Smith
Biology, Advanced Biology, Animal Science, Environmental Science
Durant High School
US Army Corps of Engineers

Part I: Overview of Business

- The U.S. Army Corps of Engineers has played an integral part in the development of our country. Throughout the 19th century the Corps built coastal fortifications, surveyed roads and canals, eliminated navigational hazards, explored and mapped the Western frontier, and constructed buildings and monuments in the nation's capital.
- Throughout the 19th century, the Corps constructed lighthouses, helped develop jetties and piers for harbors, and carefully mapped the navigation channels.
- In the 20th century the Corps became the lead federal flood control agency and significantly expanded its civil works activities, becoming the country's leading provider of recreation. Its role in responding to natural disasters also grew dramatically.

Part II: Job Specifics

- In the mid 1930s, the final lock and dam was completed on the Mississippi River, making the main channel at least 9 feet deep. That, in turn, created a place for powerful towboats to safely push large barges up and down the river.
- After construction, sediment from rivers, streams, began building up, creating the threat that some parts of the Mississippi would become too shallow for the barges to navigate. Thus began the need for dredging.
- Today, the U.S. Corps of Engineers is trying to find new places and uses for the sand from the dredge sites. They are trying to find innovative ways to keep the dredged material in place at these sites, instead of eroding and running off back into the river.

Part III: Introduce the Problem

- For the first few decades dredges simply blew or dumped the sand onto the nearest convenient piece of land and moved on. That, however, destroyed fish and wildlife habitat.
- The next problem is that the amount of sediment coming into the river is rising. Thirty years ago, it averaged about 890,000 cubic yards; now, it's 980,000. The problem is that the Mississippi has such a large watershed area, and is constantly receiving sediment from flows of the rivers and streams leading to the Mississippi.
- In 1980, Congress approved the Great River Environmental Action Team in which the Corps, state agencies, and other groups met to find specific places to put material, especially in high-maintenance areas.
- The best solution to the whole problem, is to keep the sand and dirt on the land where it is placed, and plant cover crops to help keep the sediment from eroding back into the river. These areas are considered primary successions, so getting vegetation to grow quickly is key, and most cover crop mixes have a faster growth rate than others. Plus planting cover crops will aerate the soil, and add more organic matter to change the chemistry of the topsoil layer to inhibit more vegetation in the future.

Part IV: Background

- I will be choosing a random site along the Mississippi River to be used as a dredge placement site, and my students will need to research and decide what cover crops will be used to keep the dredged material in place, and not erode back into the river.
- Students will have to research and understand how the lock and dam system and dredging work.
- Students will use the NRCS online soil survey of the Mississippi River floodplain to determine what soils are present naturally in the area, and to help them choose a cover crop mix that will have the best chance of survival.
- They will also research the different mixes of cover crops that could possible be used on a dredge site, depending on which soil types they find on the soil survey of the area chosen by me. There are certain cover crop mixes that do better in sandy soils than on loamy or clay soils.

Sources

- Cover crop website and planting guidelines - https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/climatechange/?cid=stelprdb1077238#Cover%20Crop%20Plant%20Guides
- Lock and dam website - https://www.teachengineering.org/lessons/view/cub_dams_lesson03
- Dredging website - https://en.wikipedia.org/wiki/Dredging
- Online soil survey - https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Part V: Business Solution

The Corps of Engineers reached out to the Natural Resources Conservation Service (NRCS) to help select a cover crop mix that would do better on dredge sites. The mix they choose was used to help aerate the soil, bring more organic matter to the topsoil layer, and to stabilize the soil so it can grow more vegetation in the future.

Part VI: Student Solutions

- Different types of native grasses/plants
- Trees
- Aquatic plant species from that area